Dist-County-Route: 03-Sac-5
Post Mile Limits: 0.0/17.2
Type of Work: Pavement Rehabilitation
Project ID (EA): XXXXXX
Program Identification: 201.120
Phase: ☐ PID ☒ PA/ED ☐ PS&E

Regional Water Quality Control Board(s): Central Valley (Region 5)
Total Disturbed Soil Area: 1.5 Post Construction Treatment Area: 0.0
Alternative Compliance (acres): 0.0
Estimated Const. Start Date: 1/1/17 Estimated Const. Completion Date: 12/31/19
Risk Level: RL 1 ☐ RL 2 ☒ RL 3 ☐ WPCP ☐ Other: _____
Is the Project within a TMDL watershed? Yes ☒ No ☐
TMDL Compliance Units (acres): 0.0
Notification of ADL reuse (if yes, provide date): Yes ☐ Date: _____ No ☒

This Report has been prepared under the direction of the following Licensed Person. The Licensed Person attests to the technical information contained herein and the date upon which recommendations, conclusions, and decisions are based. Professional Engineer or Landscape Architect stamp required at PS&E.

Betsy Ross 09/23/16

Betsy Ross, Registered Project Engineer/Landscape Architect — Date

I have reviewed the stormwater quality design issues and find this report to be complete, current and accurate:

George Washington 09/23/16
George Washington, Project Manager — *Date*

Paul Revere 09/23/16
Paul Revere, Designated Maintenance Representative — *Date*

Horatio Gates 09/23/16
Horatio Gates, Designated Landscape Architect Representative — *Date*

Friedrich Wilhelm von Steuben 09/23/16
[Stamp Required for PS&E only] — *Friedrich Wilhelm von Steuben, District/Regional Design SW Coordinator or Designee* — *Date*

Example Only

STORMWATER DATA INFORMATION

1. Project Description

This proposed roadway rehabilitation project is along Interstate 5 (I-5) in Sacramento County from the San Joaquin County line (PM 0.0) to the Florin Road interchange (PM 17.2). The project was divided into four segments based on the pavement rehabilitation strategy being utilized. Below is the outline of the proposed scope of work for each segment:

Segment 1 - PM 0.0 to PM 3.5

Pavement grinding, random slab replacement, dowel bar retrofit, and replacement of shoulders to remove edge drains.

Segment 2 - PM 3.5 to PM 13.0

Random slab replacements, crack and seat the existing Portland cement concrete (PCC) pavement and overlay with asphalt concrete, and replace shoulder.

Segment 3 – PM 13.0 to PM 15.7

Rehabilitate lanes #1 and 3 (grind, PCC slab replacement, overlay, and new median pavement and new concrete barrier). Reconstruct and re-grade median to eliminate the need for a median ditch and place new median pavement and concrete median barrier for traffic safety purposes.

Segment 4 – PM 15.7 to PM 17.2

Random slab replacements, crack and seat the existing PCC pavement and overlay with hot mix asphalt.

This project cannot be considered routine maintenance because line, grade, and hydraulic capacity have been changed due to the increase in impervious area of the new median pavement and new concrete barrier in Segment 3.

In general construction projects that result in a land disturbance of equal to or greater than one acre are subject to California's Construction General Permit (CGP). The total disturbed soil area (DSA) for this project is expected to be 1.5 acres. Grading in Segment 3 will result in 0.8 acreas of DSA to accommodate the new median pavement and new concrete median barrier. Construction staging area in Segment 1 include 0.4 acres of DSA. Shoulder backing areas includes 0.1 acres of DSA in Segment 1 and includes 0.2 acres of DSA in Segment 3. Consequently, this project will seek coverage under the CGP.

The estimated existing impervious area is 150 acres, and post project impervious area 150.8 acres. The difference in before and after project impervious area is the net new impervious (NNI) and equal to 0.8 acres, resulting from median paving in Segment 3. No replaced impervious surface (RIS) is anticipated as pervious subgrade will not be exposed during construction when replacing the pavement.

The new impervious surface (NIS) is the combination of NNI and RIS. NIS equals 0.8 acres.

Example Only

There are no additional treated areas (ATA) for this project. ATA #1 is any existing Treatment BMP removed or modified by the project. ATA #2 is when NNI for the project is greater than 50 percent of the total post-project impervious area and the entire impervious area is included in the post construction treatment area (PCTA). When the NNI is less than or equal to 50 percent of the total post-project impervious area, no additional impervious area is required to be treated.

The PCTA is the combination of NIS and ATA. Since PCTA is less than 1 acre no treatment BMPs are required.

Table 1-1 DSA and PCTA Totals.

Seg	DSA (acres)	Existing Impervious Area, acres	Post Impervious Area, acres	Net New Impervious Surface (NNI), acres	Replaced Impervious Surface (RIS), acres	New Impervious Surface (NIS), acres	ATA #1, acres	ATA #2, acres	PCTA, acres
1	0.1	30	30	0	0	0	0	0	0
2	0	83	83	0	0	0	0	0	0
3	1.4	24	24.8	0.8	0	0.8	0	0	0
4	0	13	13	0	0	0	0	0	0
Total	1.5	150	150.8	0.8	0	0.8	0	0	0

This project is entirely within the City and County of Sacramento Municipal Separate Storm Sewer System (MS4) permit area.

2. Site Data and Stormwater Quality Design Issues

The Central Valley Regional Water Quality Control Board (CVRWQCB) has jurisdiction within the project limits.

A water Quality Assessment Report (WQAR) was prepared for this project.

A 401 Water Quality Certification is not anticipated.

Hydrologic Units

The project area is located in three hydrologic sub-areas of the Sacramento Delta HU: undefined (510.0), Franklin (519.11), and undefined (544).

Receiving Water Bodies

The direct receiving water bodies are Morrison Creek and the Mokelumne River at the northern and southern ends of the project. In between, project runoff is conveyed in a series of roadway drainage channels that eventually discharge to unnamed streams, most of which ultimately discharge to the eastern portion of the Sacramento-San Joaquin Rivers' Delta. A small portion of the flow is directed to the City of Sacramento's Sump 90, located west of I-5 and Morrison Creek, where it is pumped through the levee and into the Sacramento River. This stretch of the Sacramento River, however, is downstream of the I Street Bridge in downtown Sacramento, which is defined as being part of the Delta in the CVRWQCB's Basin Plan for Region 5.

Example Only

List of 303(d) Impaired Receiving Water Bodies and Pollutants

(Based on RWQCBs Final 2012 CA Integrated Report)

Caltrans WQPT was used to determine the information in this section.

Delta Waterways (northern portion)

Pollutant
Chlordane
Chlorpyrifos
DDT (Dichlorodiphenyltrichloroethane)
Diazinon
Dieldrin
Group A Pesticides
Invasive Species
Mercury
PCBs (Polychlorinated biphenyls)
Unknown Toxicity

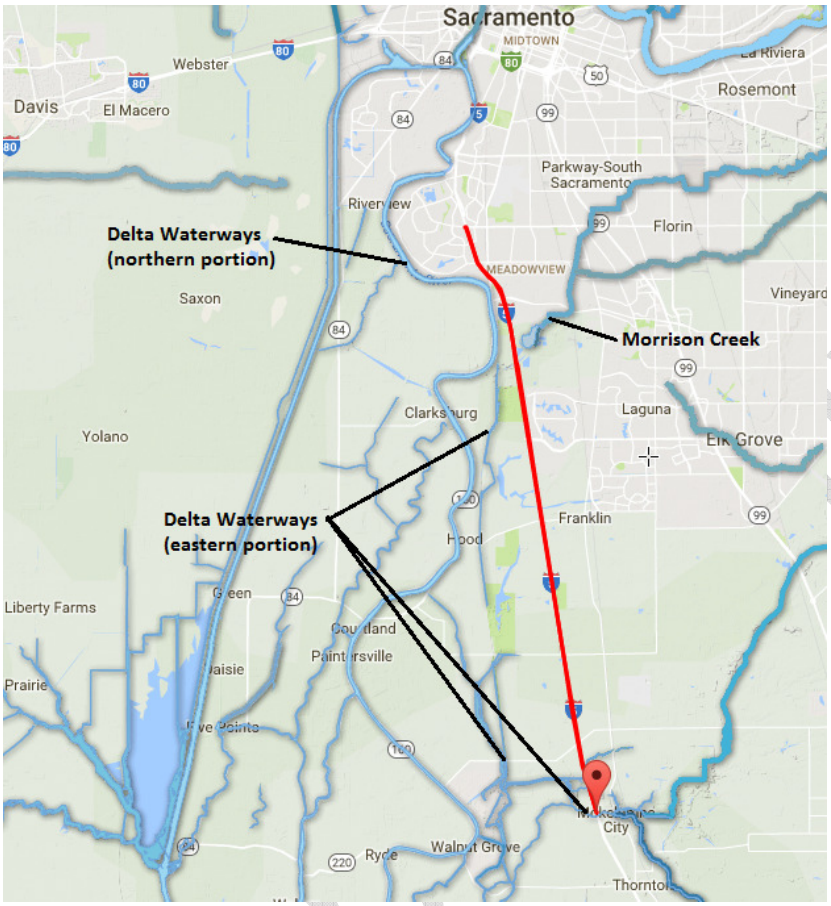
Delta Waterways (eastern portion)

Pollutant
Chlorpyrifos
DDT (Dichlorodiphenyltrichloroethane)
Diazinon
Group A Pesticides
Invasive Species
Mercury
Unknown Toxicity

Morrison Creek

Pollutant
Pentachlorophenol (PCP)
Pyrethroids
Sediment Toxicity
Diazinon

Example Only



303(d) Listed Waterbodies near Project

Project TMDLs–TMDLs listed in Attachment IV of Caltrans NPDES Permit (ORDER 2012-0011-DWQ)

Caltrans Portal was used to determine the information in this section.

Caltrans Adopted TMDLs in Project Limits	Pollutant	District	County	Route	Post Mile (PM)	
					To	From
Sacramento - San Joaquin River Delta Estuary	Methyl mercury	3	Sac	5	0.0	5.9
Sacramento - San Joaquin River Delta Estuary	Methyl mercury	3	Sac	5	10.7	17.2

Climate

The climate is mild with temperatures ranging from lows in the upper 30s in January to highs in the low 90s in July. The rainy season has been defined by Caltrans as October 15 to April 15. The average monthly precipitation ranges from 0.04 inches in July to 3.74 inches in January. Rainfall intensities based on the Sacramento City Rain Gauge are 0.73 inches/hour for a 10-year return and 1.03 inches/hour for a 100-year return period.

Topography

Based on aerial and street view photos, the terrain is generally flat with small variations in elevation at bridges. The United States Geological Survey (USGS) topographic maps identify the elevations ranging from sea level to 10 feet with no hills or mountains within the project area.

Soil Characteristics

The Natural Resources Conservation Service (NRCS) identifies the soils in the project vicinity as mainly Hydrologic Soil Group (HSG) D with a few areas of HSG C. Preliminary geotechnical studies have determined that over 85 percent of the highway along this corridor is on either cut or fill soils. Fill slopes associated with the construction of this project that will be made as flat as possible, not exceeding 4:1 (H:V). Detailed soil characterization will be provided once geotechnical studies for the project have been completed.

Aerially Deposited Lead (ADL)

Because lead was used as an additive to gasoline prior to 1986, the surface soils along I-5 have the potential to be contaminated with aerially deposited lead (ADL) from the exhaust of cars burning lead gasoline. Further hazardous waste testing will be completed during the later phases of this project.

Groundwater Information

A review of historic Log of Test Borings for the Hood/Franklin Road overcrossing (O.C.)., Elk Grove Boulevard O.C., Beach Lake Bridge, Route 51160 S.O.H., and Florin Road O.C. show the groundwater to be from 6.0 feet to 32.5 feet below original grade.

Erosion Potential

The Caltrans Water Quality Planning Tool (WQPT) was used to estimate the erodibility of the site. The erosion factor K within the project area ranges from 0.24 to 0.37, with a weighted average of 0.29.

Measures for Avoiding or Reducing Potential Storm Water Impacts

Land Use

The land use for the project area was determined by examining aerial photos. Between PM 0.0 and 9.4, the existing land is primarily agricultural. From PM 9.4 to 15.0, land use remains primarily agricultural on the west side of I-5, with some residential development on the east side. Beyond PM 15.0, land use consists of a mix of residential and commercial development as I-5 enters the metropolitan Sacramento area.

Right-of-Way Requirements

Currently, all work and BMPs will be within Caltrans R/W. If additional R/W is determined to be required, then the project team will work with Caltrans R/W and Design to determine the amount and cost of additional R/W.

3. Construction Site BMPs to be used on Project

Example Only

Project specific BMP measures will be specified and quantified during the design phase. Temporay construction BMPs have been estimated at 3% of the total project cost ($12,000,000) in accordance with the Project Initiation Cost Estimate Method, Appendix F.3.1, 2016 PPDG.

Risk Assessment

This project was determined to be Risk Level 2 based on Method 1, GIS Map Method, Appendix 1, 2009 CGP.

Construction Site BMP Strategy

The construction work for this project is scheduled to cover three years.

DSAs will be protected in accordance with the project's approved SWPPP. Erosion control BMPs such as temporary hydraulic mulch should be placed when staging requires the protection of newly graded slopes. Temporary cover should be placed for quick and short-term stabilization of DSAs in preparation for an approaching storm or in the interim between staged soil disturbances.

Sediment control measures such as temporary silt fences will minimize sediment-laden sheet flows from discharging off-site. Temporary fiber rolls should also be utilized where necessary as a sediment control measure to intercept sheet and concentrated flow runoff and minimize the run-on upslope of the project. Temporary drainage inlet protection should be utilized to prevent sediment from entering the current or proposed storm drains.

The project will involve the movement of dirt, by construction equipment, adjacent to public roadways. In order to prevent the tracking of mud and dirt off-site, stabilized construction entrances/exits should be placed at multiple points throughout the project area. Street sweeping should also be utilized to remove tracked sediment. These tracking control items will be specified as separate bid line items during the design phase.

Concrete wastes shall be managed through the use of concrete washout facilities.

Various waste management, materials handling, and other housekeeping items shall be used throughout the duration of the project. Stockpiles of various kinds are anticipated and shall be maintained with the appropriate BMPs.

A meeting with Jake Luby, Caltrans Construction Storm Water Coordinator, was held on September 15, 2016. The Construction unit concurs with the Construction Site BMP strategy and development for this stage of the project.

4. Maintenance BMPs

Drain inlet stenciling is not required because pedestrian traffic is prohibited within the project limits.

The project design allows for the ease of maintaining all best management practices (BMPs).

5. Other Water Quality Requirements and Agreements

No project-specific PLACs, or other communication or coordination with the RWQCB apply to the project at this time.

Example Only

6. Permanent BMPs

Rapid Stream Assessment (RSA)

This project does not require an RSA based on using the algorithm (items 1-4 below) provided in Section 2 of Caltrans Hydromodification Guidance dated February 2015. No RSA is required based on item 2.

1. This project includes stream crossings.
2. This project does not include 1 acre or more of net new impervious (NNI) surface.
3. The NNI is within the stream threshold drainage areas.
4. Stream crossings are "Water of the US" as defined by Army Corps of Engineers latest guidance on determination of jurisdiction for CWA section 404.

Downstream Effects Related to Potentially Increased Flow, Checklist DPP-1, Parts 1 and 2

The proposed improvements will increase the impervious area within the project limits. This increase should have a negligible impact on downstream flow. Onsite drainage will change however runoff will be conveyed to the same outfall locations. The negligibility of flow changes will be confirmed during drainage design and appropriate mitigation deployed if required.

Segments 1 and 2 will not change velocity or volume of downstream flows because the work in these areas involves only roadway rehabilitation and creates no new impervious area.

Segments 3 and 4 will not increase the velocity and volume of downstream flows, but will slightly modify the local drainage along the roadway. Currently, stormwater from the traveled way in these areas sheet flows to the outside shoulders and into roadside ditches. The median areas outside the traveled way drain to inlets along the median and discharge to the same roadside ditches. To allow for proper staging, the median areas for segments 3 and 4 will be overlaid or reconstructed to conform to the traveled way elevations and allow for stormwater from the median to sheet flow to the outside shoulders. While the direction of flow along the median will be modified, it does not change the overall drainage watershed because all flows from the roadway (traveled way and median) still combine at the roadside ditches.

Slope/Surface Protection Systems, Checklist DPP-1, Parts 1 and 3

There are minimal slope stabilization concerns because most of the work proposed for this project will be contained with the existing roadway footprint, and the slopes are mild. All DSAs will consist of median re-grading areas, where both the proposed and existing surfaces will have slopes of less than 10 percent.

At this phase of the project, the cost of design pollution prevention measures is estimated based on the size and complexity of the project. Individual design pollution prevention measures, including slope stabilization measures, will be identified during the design phase.

Concentrated Flow Conveyance Systems, Checklist DPP-1, Parts 1 and 4

Example only

For segments 1 and 2, the drainage pattern will not be altered. Runoff along the traveled way will continue to sheet flow to the outside shoulders. The median area drainage will remain the same as the existing condition, with flow from median drain inlets periodically conveyed through culverts to the roadside drainage ditches and channels (PM 0.0 to PM 13.0, south of Morrison Creek). For segments 3 and 4, from north of Morrison Creek to the end of the project limits, the drainage pattern will be altered. The median will be reconstructed to allow for sheet flow across the traveled way to the edge of shoulder, and the median drainage inlets will be capped and abandoned.

This project proposes to cap and abandon existing drainage inlets. Existing cross drains that will no longer receive runoff will also be abandoned. There are currently no known existing areas of erosion or slope failures at existing culvert crossings, so additional installation of flared end sections, rock slope protection or other outlet protection/velocity dissipation devices may not be required for the project. However, because the runoff will be draining to existing or proposed roadway ditches, calculations to be conducted during the design phase should show that the increase in volume can be contained within the ditches and that the increase in flow and velocity will not result in erosion or scour if the ditches are only vegetated and not lined with rock or other hard material.

Preservation of Existing Vegetation, Checklist DPP-1, Parts 1 and 5

Existing vegetation will be preserved to the maximum extent practicable. ESA fencing will be installed where necessary and will be shown in the Contract Plans with consultation from the Environmental Coordinator. Access by the Contractor is prohibited for the preservation of existing vegetation or protection of biological habitat. The project will have minimum clearing and grubbing because the majority of the project is currently paved. A 5 foot wide swath will be graded 4:1 (H:V) with shoulder backing material for newly placed asphalt concrete overlay.

Treatment BMP Strategy

This project is not required to consider treatment BMPs because the added impervious area is less than 1 acre; see the attached Evaluation Documentation Form.

No Compliance Units will be generated with this project. This project discharges to a TMDL watershed where Caltrans is a named stakeholder. A PDT meeting was held in May 2016 to address TMDL Compliance Unit (CU) credits. The District NPDES Coordinator concurred that no treatment BMPs will be incorporated to generate CU credits.

The following existing treatment BMP is present within the project limits and receives run off from the construction area pavement. Changes in tributary area will be determined during design phase, but the existing bioswale is expected to have capacity to treat additional tributary pavement area.

ID	County	Rte	PM	Loc1	Loc2	BMP Type	Description
SWSAC005-S017110	SAC	005	17.11	S		BIOSWL	BIOFILTRATION -BIO-SWALE

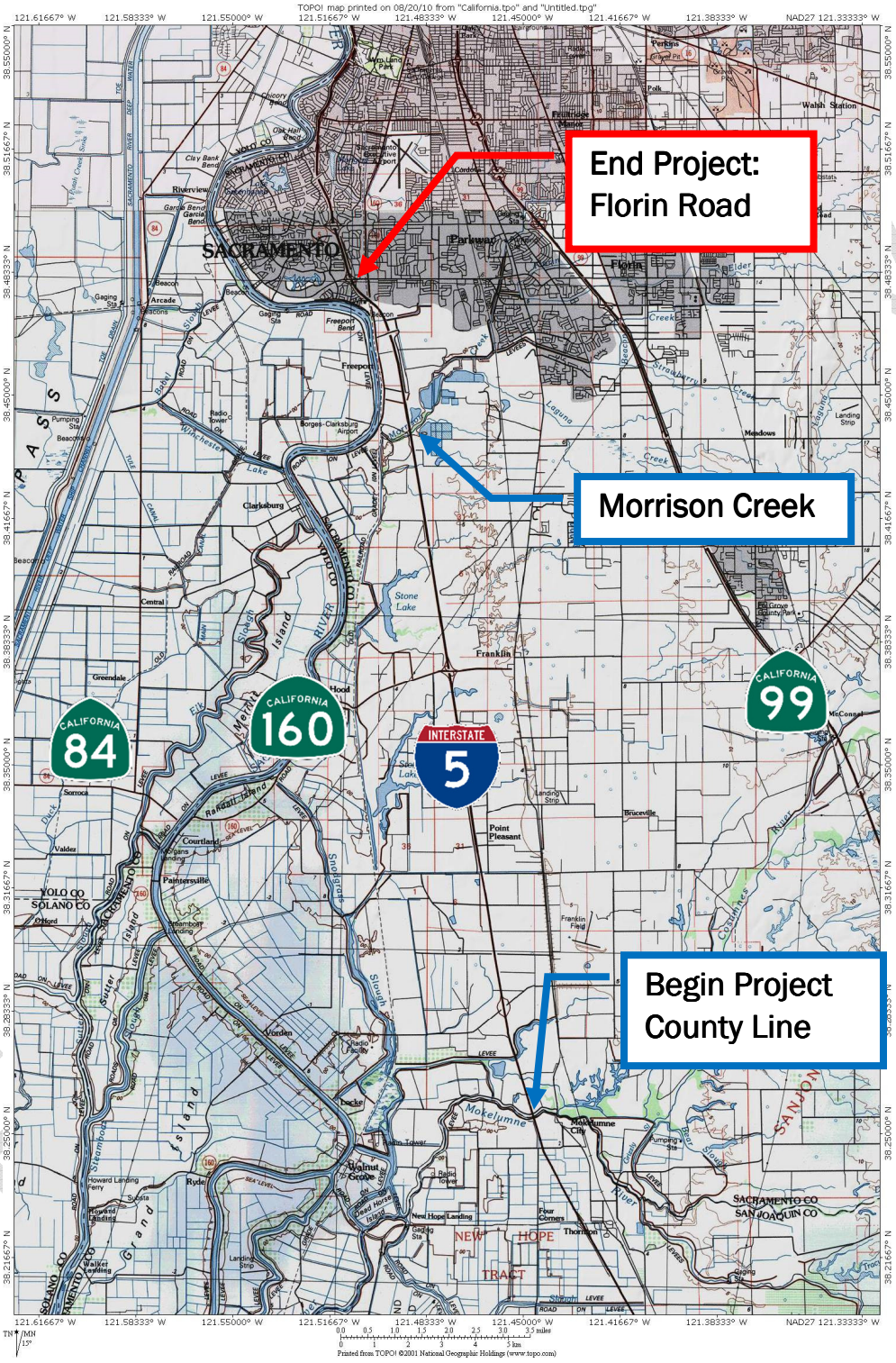
Example Only

Required Attachments

- Vicinity Map
- Evaluation Documentation Form (EDF)
- Risk Level Determination Documentation
- SWDR Summary Spreadsheets

Example Only

Vicinity Map



Source: United States Geological Survey (USGS)

Evaluation Documentation Form

DATE: 09-23-16

Project ID (EA): XXXXX

No.	Criteria	Yes ✓	No ✓	Supplemental Information for Evaluation
1.	Begin Project evaluation regarding requirement for implementation of Treatment BMPs	✓		See Figure 4-1, Project Evaluation Process for Consideration of Treatment BMPs. Continue to 2.
2.	Is the scope of the Project to install Treatment BMPs (e.g., Alternative Compliance or TMDL Compliance Units)?		✓	If **Yes**, go to 8. If **No**, continue to 3.
3.	Is there a direct or indirect discharge to surface waters?	✓		If **Yes**, continue to 4. If **No**, go to 9.
4.	As defined in the WQAR or ED, does the project: a. discharge to areas of Special Biological Significance (ASBS), or b. discharge to a TMDL watershed where Caltrans is named stakeholder, or c. have other pollution control requirements for surface waters within the project limits?	 ✓ 	✓ ✓	If **Yes to any**, contact the District/Regional Design Stormwater Coordinator or District/Regional NPDES Coordinator to discuss the Department's obligations, go to 8 or 5. FWS *(Dist./Reg. Coordinator initials)* If **No** to all, continue to 5.
5.	Are any existing Treatment BMPs partially or completely removed? (ATA condition #1, Section 4.4.1)		✓	If **Yes**, go to 8 **AND** continue to 6. If **No**, continue to 6.
6.	Is this a Routine Maintenance Project?		✓	If **Yes**, go to 9. If **No**, continue to 7.
7.	Does the project result in an increase of one acre or more of new impervious surface (NIS)?		✓	If **Yes**, go to 8. If **No**, go to 9.
8.	Project is required to implement Treatment BMPs.	Complete Checklist T-1, Part 1.		
9.	Project is not required to implement Treatment BMPs. FWS *(Dist./Reg. Design SW Coord. Initials)* BR *(Project Engineer Initials)* 09/23/16 *(Date)*	Document for Project Files by completing this form and attaching it to the SWDR.		

Example Only

Figure 1 . R Factor (Value=127)

Facility Information

- Start Date: 01/01/2017
- End Date: 12/31/2019
- Latitude: 38.3754
- Longitude: -121.4756

Erosivity Index Calculator Results

An erosivity index value Of **127** has been determined for the construction period of **01/01/2017 - 12/31/2019**.

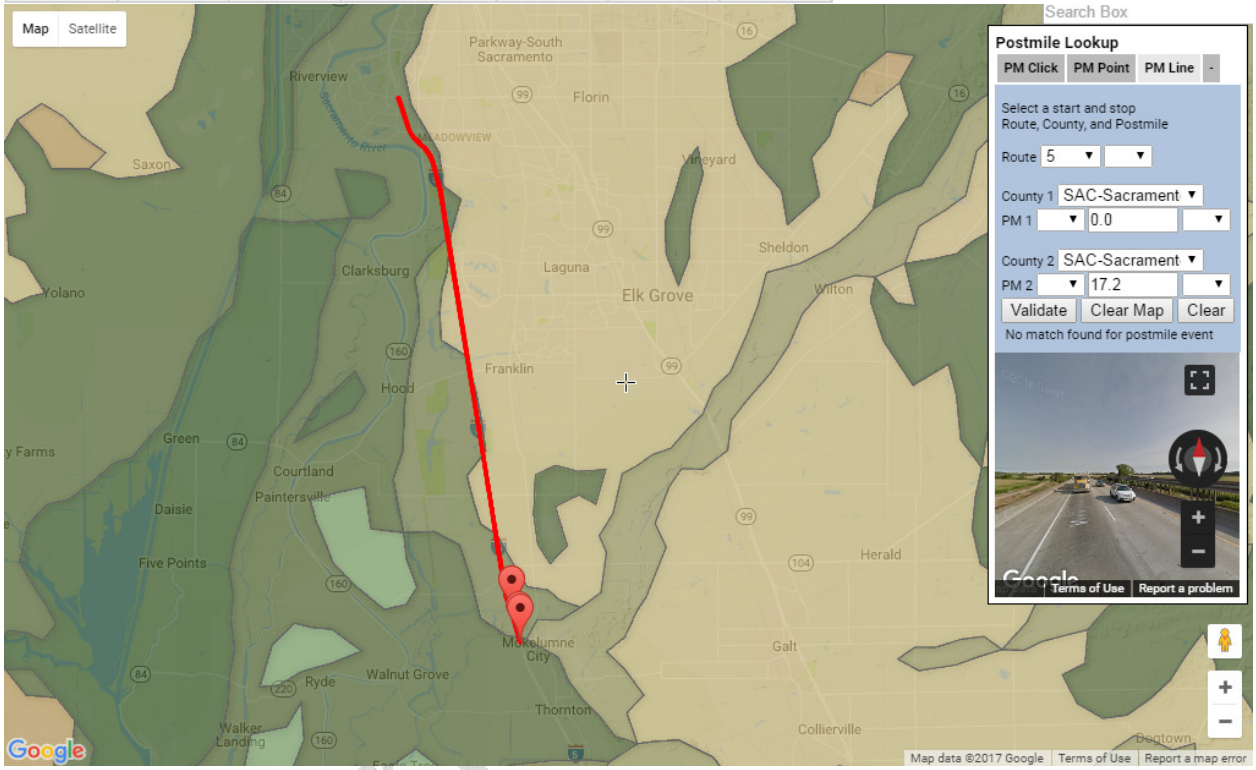
A rainfall erosivity factor of 5.0 or greater has been calculated for your site and period of construction. **You do NOT qualify for a waiver from NPDES permitting requirements.**

Source: < https://www.epa.gov/npdes/rainfall-erosivity-factor-calculator-small-construction-sites>

Example Copy

Figure 2 . K Factor from GIS Map (Value=0.29)

	KxL	k	Total Length			
	6624	0.24	27600			
	10052	0.28	35900		17.2	mi
	10119.5	0.37	27350		90816	ft
	26795.5		90850	ft		
∑kL / ∑L =	0.29					

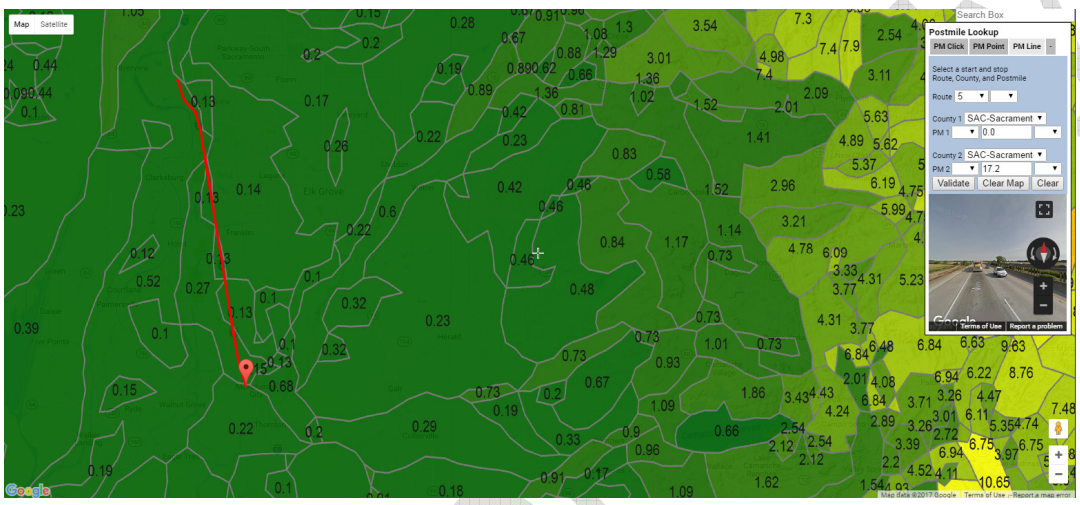


Source: Caltrans WQPT

Exam

Figure 3 . LS Factor from GIS Map (Value=0.27)

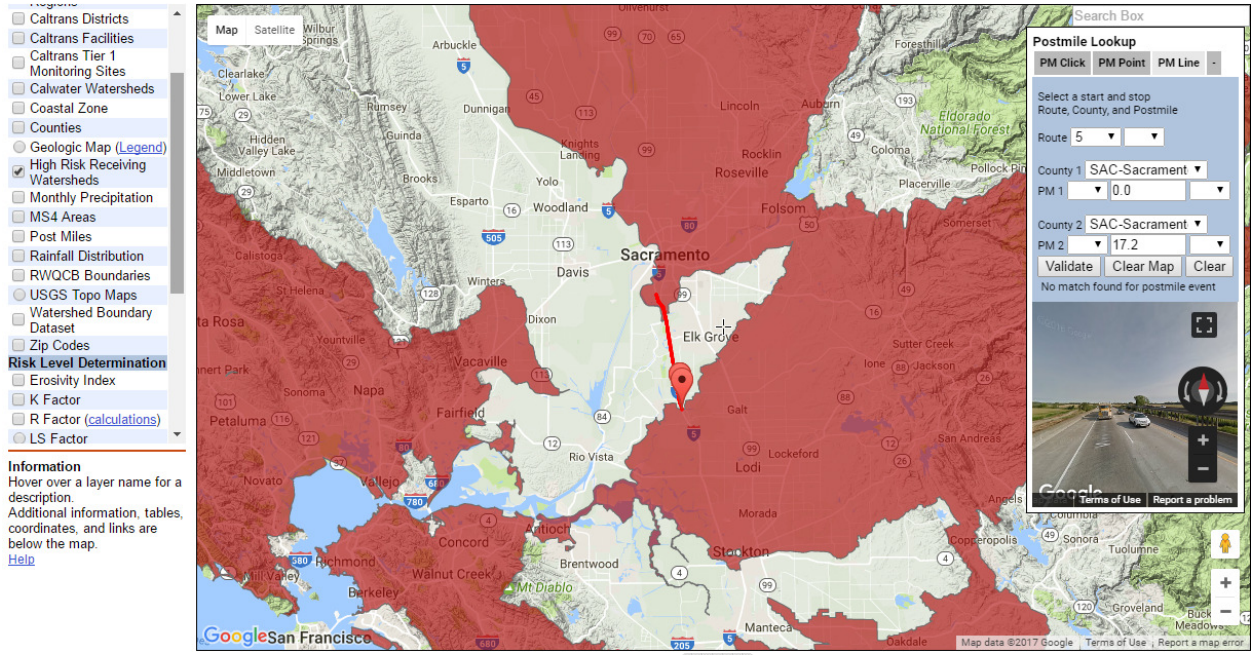
	LSxL	LS			Total Length			
	6084	0.13	46500		46800			
	4941	0.27	21000		18300		17.2	mi
	13364	0.52	25700		25700		90816	ft
	24389				90800	ft		
∑LSxL / ∑L	0.27							



Source: Caltrans WQPT

Example

Figure 4: Receiving Water Risk GIS Map



Source: Caltrans

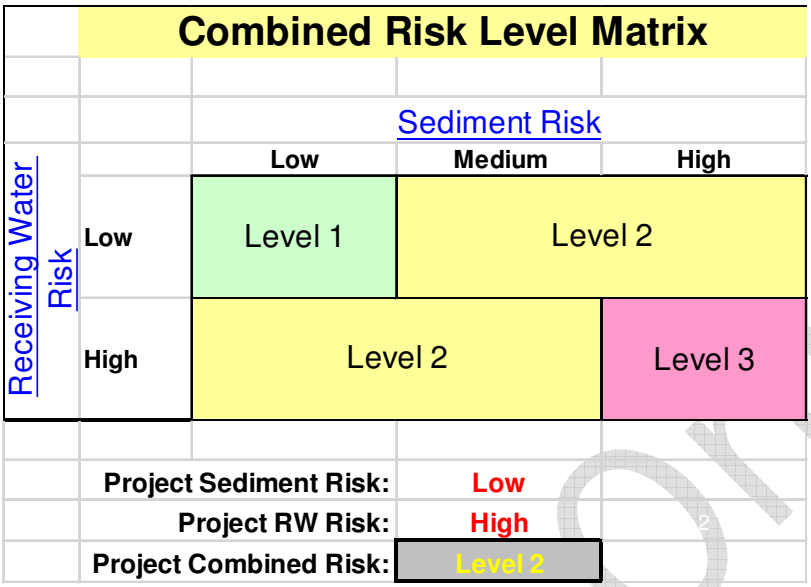
Example

Figure 5 . Sediment Risk Factor Worksheet

Sediment Risk Factor Worksheet	Entry
A) R Factor	
Analyses of data indicated that when factors other than rainfall are held constant, soil loss is directly proportional to a rainfall factor composed of total storm kinetic energy (E) times the maximum 30-min intensity (I30) (Wischmeier and Smith, 1958). The numerical value of R is the average annual sum of EI30 for storm events during a rainfall record of at least 22 years. "Isoerodent" maps were developed based on R values calculated for more than 1000 locations in the Western U.S. Refer to the link below to determine the R factor for the project site.	
http://cfpub.epa.gov/npdes/stormwater/LEW/lewCalculator.cfm	
R Factor Value	127
B) K Factor (weighted average, by area, for all site soils)	
The soil-erodibility factor K represents: (1) susceptibility of soil or surface material to erosion, (2) transportability of the sediment, and (3) the amount and rate of runoff given a particular rainfall input, as measured under a standard condition. Fine-textured soils that are high in clay have low K values (about 0.05 to 0.15) because the particles are resistant to detachment. Coarse-textured soils, such as sandy soils, also have low K values (about 0.05 to 0.2) because of high infiltration resulting in low runoff even though these particles are easily detached. Medium-textured soils, such as a silt loam, have moderate K values (about 0.25 to 0.45) because they are moderately susceptible to particle detachment and they produce runoff at moderate rates. Soils having a high silt content are especially susceptible to erosion and have high K values, which can exceed 0.45 and can be as large as 0.65. Silt-size particles are easily detached and tend to crust, producing high rates and large volumes of runoff. Use Site-specific data must be submitted.	
Site-specific K factor guidance	
K Factor Value	0.29
C) LS Factor (weighted average, by area, for all slopes)	
The effect of topography on erosion is accounted for by the LS factor, which combines the effects of a hillslope-length factor, L, and a hillslope-gradient factor, S. Generally speaking, as hillslope length and/or hillslope gradient increase, soil loss increases. As hillslope length increases, total soil loss and soil loss per unit area increase due to the progressive accumulation of runoff in the downslope direction. As the hillslope gradient increases, the velocity and erosivity of runoff increases. Use the LS table located in separate tab of this spreadsheet to determine LS factors. Estimate the weighted LS for the site prior to construction.	
LS Table	
LS Factor Value	0.27
Watershed Erosion Estimate (=RxKxLS) in tons/acre	9.9441
Site Sediment Risk Factor Low Sediment Risk: < 15 tons/acre Medium Sediment Risk: >=15 and <75 tons/acre High Sediment Risk: >= 75 tons/acre	**Low**

Example Only

Figure 6 . Risk Level Determination (Value=Risk Level 2)



Source: State Water Resources Control Board

Example Only

SWDR Summary Spreadsheets

SWDR

SWDR Signed Date	District	EA/Project ID	County	Route	Beg_PM	End_PM	Project Description	Project Phase	Long SWDR	Risk Level	DSA (ac)	TMDL Waterbody
9/23/2016	3	XXXXXX	SAC	5	0.00	17.20	Pavement Rehabilitation	PAED	Yes	RL2	1.5	Yes

Biofiltration Strips and Swales	Detention	Infiltration Devices	GSRD	TST	MedFilter	DPPIA	SA	Other BMP	Est. Const_Start	Est. Const _Comp	SW Comment
0	0	0	0	0	0	0	0	0	1/1/2017	12/31/2019	

Post Const Treatment Area (ac)	Treated Impervious Area (ac)	Treated Impervious Area Balance (ac)	Treated Pervious Area (ac)	Stabilized Area (ac)	MWELO	RSA
0.00	0.00	**0.00**	0.00	0.00	No	No

Example Only